

REMARKS

The Pending Claims

The pending claims are directed to chemical-mechanical polishing compositions comprising amine-containing polymers. Claims 1-17 currently are pending.

Discussion of the Claim Amendments

Claims 1 and 12 have been amended to more particularly point out and distinctly claim the subject matter which Applicants regard as their invention. In particular, the claims have been amended to replace the phrase “a polishing pad and/or an abrasive” with the equivalent phrase “a polishing component selected from the group consisting of (i) a polishing pad, (ii) an abrasive, and (iii) a polishing pad and an abrasive.” Claims 18-24 have been canceled, without prejudice or disclaimer of the subject matter recited therein, as being directed to a nonelected invention in response to a restriction requirement. No new matter has been added by way of these amendments.

Summary of the Office Action

The Office Action withdraws claims 18-24 from further consideration pursuant to Applicants’ election, without traverse, of the claims of Group I (i.e., claims 1-17) for further prosecution. The Office Action rejects claims 1-17 under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. The Office Action also rejects claims 1-3 and 7-8 under 35 U.S.C. § 102(b) as allegedly anticipated by Japanese Patent Application Publication No. 11-302633 (Miyashita et al.) (hereinafter “the Miyashita ‘633 publication”). The Office Action also rejects claims 1-4 and 7-10 under 35 U.S.C. § 102(a) as allegedly anticipated by International (PCT) Patent Application Publication No. WO 01/12740 A1 (Wang et al.) (hereinafter “the Wang ‘740 publication”). The Office Action rejects claims 9-11 under 35 U.S.C. § 103(a) as allegedly unpatentable over the Miyashita ‘633 publication in view of U.S. Patent 6,478,834 (Tsuchiya et al.) (hereinafter “the Tsuchiya ‘834 patent”). Lastly, the Office Action indicates that claims 5-6 would be allowable if rewritten in independent form and that claims 12-17 would be allowable if amended to overcome the rejection under section 112, second paragraph.

Discussion of the Section 112, Second Paragraph, Rejection

The Office Action rejects the pending claims as allegedly indefinite due to the use of the alternative phrase “and/or” in the claims. As noted above, the claims have been amended

to replace the phrase “a polishing pad and/or an abrasive” with the equivalent phrase “a polishing component selected from the group consisting of (i) a polishing pad, (ii) an abrasive, and (iii) a polishing pad and an abrasive.” The scope of the subject matter embraced by the pending claims is clear from the language used therein. Therefore, the section 112, second paragraph, rejection of claims 1-17 has been rendered moot and should be withdrawn.

Discussion of the Section 102 and 103 Rejections

The Office Action rejects claims 1-4 and 7-10 as allegedly anticipated by either the Miyashita ‘633 publication or the Wang ‘740 publication. The Office Action also rejects claims 9-11 as allegedly obvious over the Miyashita ‘633 publication in view of the Tsuchiya ‘834 patent. Applicants traverse these rejections.

The cited references, whether considered alone or in combination, fail to teach or suggest a chemical-mechanical polishing system comprising at least one amine-containing polymer with about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups. As understood by those of ordinary skill in the art, a polymer is a substance composed of macromolecules, which are molecules of relatively high molecular mass, the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of relatively low molecular mass (see, e.g., the IUPAC Compendium of Chemical Terminology, 2nd Ed. (1997)). Thus, a polymer, as recited in the pending claims, comprises multiple repeating units derived from molecules having relatively low molecular masses.

The Miyashita ‘633 publication generally relates to a polishing composition comprising a water-soluble cellulose, a silica abrasive, a pH modifier, and, optionally, a water-soluble amine compound. The Miyashita ‘633 publication further provides that suitable water-soluble amines include diethanolamine, triethanolamine, diethylenetriamine, triethylenetriamine, tetraethylenepentamine, pentaethylenehexamine, triethylenediamine, 2-aminoethanol, polyethyleneimine, and aminoethylethanolamine. However, with the exception of polyethyleneimine, none of the water-soluble amine compounds listed in the Miyashita ‘633 publication can properly be considered a polymer, as that term is understood by those of ordinary skill in the art. Furthermore, the nitrogen atoms of the amino functional groups present in a polyethyleneimine are separated by only two sequential atoms (i.e., the two carbon atoms of the ethylene groups), as opposed to the about 5 or more atoms recited in the pending claims. Therefore, the Miyashita ‘633 publication does not disclose the invention defined by claims 1-11.

The Wang '740 publication is generally directed to a polishing system comprising a liquid carrier, at least one oxidizing agent, at least one polishing additive, and a polishing pad and/or an abrasive. The Wang '740 publication further provides that suitable polishing additives include polyethyleneimine, 2-aminoethyl phosphonic acid, amino(trimethylenephosphonic acid), diethylenetriaminepenta(methylene-phosphonic acid), hexamethylenediamine-tetra(methylene phosphonic acid), and polymers comprising up to 50 or more repeating units having the following general structure: XY-NCR¹R²CR³R⁴N-X'Y'. The Wang '740 publication also provides that the polishing system can further comprise a stopping compound, such as a polyetheramine, a polyethyleneimine, or several other nitrogen-containing compounds. Thus, contrary to the Office Action's assertions, the Wang '740 publication does not disclose a polishing system comprising at least one amine-containing *polymer* with about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups. In particular, many of the amine-containing compounds disclosed in the Wang '740 publication and referenced in the Office Action (e.g., diethylenetriaminepenta(methylene-phosphonic acid)) cannot properly be considered polymers, as recited in the pending claims. Furthermore, those amine-containing compounds that are polymers disclosed in the Wang '740 publication do not have about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups. As noted above, polyethyleneimines have only two sequential atoms separating the nitrogen atoms of their amino functional groups. Also, the polymers embraced by the general structure disclosed in the Wang '740 publication only have two sequential atoms separating the nitrogen atoms of their amino functional groups. Therefore, the Wang '740 publication does not disclose the invention defined by claims 1-11.

The Tsuchiya '834 patent is generally directed to a polishing slurry comprising a polishing grain, an oxidizing agent, and a higher-mono-primary amine. The Tsuchiya '834 patent defines a higher-mono-primary amine as an amine-based compound comprising one primary amine group and a "higher substituent" that is bonded to the nitrogen atom and has a "molecular weight high enough to allow [the] amine-based compound to form a hydrophobic interaction" (see, e.g., the Tsuchiya '834 patent at col. 5, lines 15-23). The Tsuchiya '834 patent further provides several examples of suitable higher-mono-primary amines, none of which is an amine-containing polymer, much less an amine-containing polymer with about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups. Therefore, the Tsuchiya '834 patent does not disclose the invention defined by claims 1-11.

Moreover, the invention defined by the pending claims cannot properly be considered obvious over the cited references, regardless of whether the references are considered alone

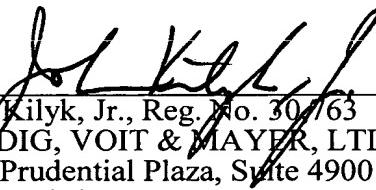
or in combination. As noted above, none of the cited references discloses or suggests a polishing composition comprising at least one amine-containing polymer with about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups. Furthermore, the cited references do not contain any teaching and the Office Action fails to identify any knowledge generally available to those of ordinary skill in the art at the time of invention that suggests that the number of sequential atoms separating the nitrogen atoms of the amino functional groups present in the amine-containing polymer is a result effective variable. Therefore, the Office cannot properly assert that one of ordinary skill in the art, at the time of invention, would have been motivated to modify any of the polishing compositions disclosed in the cited references in such a way as to arrive at a composition comprising an amine-containing polymer with any specific number of sequential atoms separating the nitrogen atoms of its amino functional groups, much less the number recited in the pending claims. Accordingly, the Office Action fails to demonstrate that the invention defined by claims 1-11 is *prima facie* obvious over the cited references.

In view of the foregoing, the invention defined by the pending claims cannot properly be considered anticipated by or obvious over the Miyashita '633 publication, the Wang '740 publication, or the Tsuchiya '834 patent, whether considered individually or collectively. In particular, the cited references fail to disclose or suggest a polishing composition comprising at least one amine-containing polymer with about 5 or more sequential atoms separating the nitrogen atoms of the amino functional groups. Thus, the section 102 and 103 rejections of claims 1-11 are improper and should be withdrawn.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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Date: July 7, 2004